# United States Patent [19]

**Bozek**

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[45] **Date of Patent: Jul. 24, 1990**


[54] **CROSS BOW WITH IMPROVED COCKING MECHANISM**


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[21] Appl. No.: **178,763**

[22] Filed: **Mar. 28, 1988**

**Related U.S. Application Data**

[63] Continuation of Ser. No. 859,698, May 5, 1986, abandoned, which is a continuation-in-part of Ser. No. 778,316, Sep. 20, 1985, Pat. No. 4,649,892.

[51] **Int. Cl.**[5] ..... **F41B 5/00**

[52] **U.S. Cl.** ..... **124/25;** 124/35.1

[58] **Field of Search** ..... 124/25, 35 R, 31, 41 R, 124/27, 26, 22, 21, 83, 84, 20 B, 20 R, 24 R



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*Primary Examiner*—Peter M. Cuomo

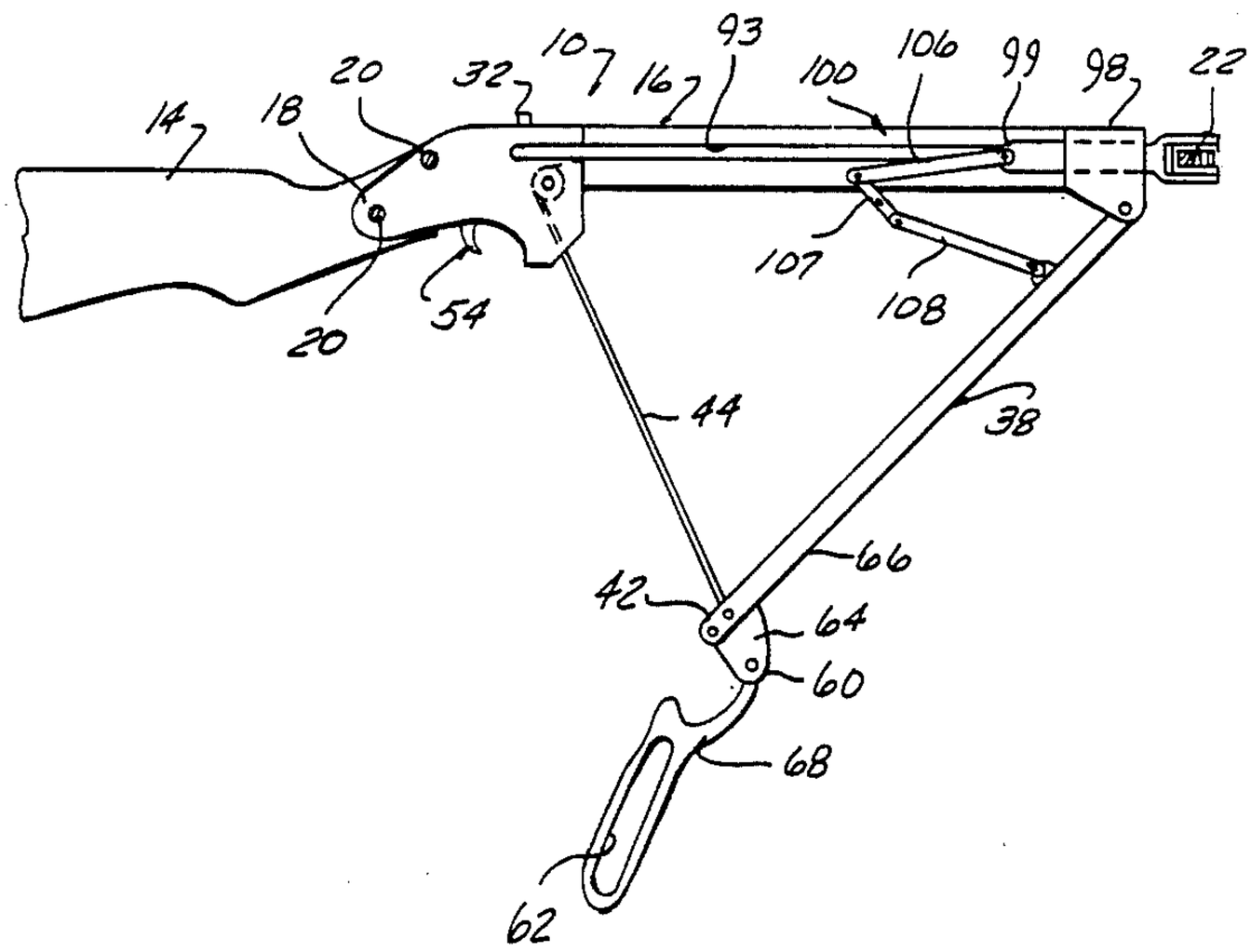
*Attorney, Agent, or Firm*—John R. Benefiel



[57] **ABSTRACT**

A cross bow is disclosed which includes a cocking mechanism for moving the drawstring to the drawn position. A cocking lever is pivotally mounted beneath the cross bow stock and an operating cable connected at one end to the cocking lever is pulled by pivoting motion of the cocking lever away from the stock member. The operating cable is connected at its other end to an engagement block movable in a lengthwise track and engages the drawstring either directly or through a slider element also mounted in the track, such as to be slid rearwardly upon pivoting of the cocking lever away from the stock to a cocked position in which it is held by a trigger mechansim. The prod is mounted on a movable slide, which in turn is connected to a cocking lever operated linkage so as to be retracted a lesser distance as the cocking lever is pivoted to draw the drawstring and extended as the cocking lever is pivoted back towards the stock to cause the prod limbs to be bent against the restraint of the trigger mechanism. This reduces the peak drawing effort required to cock the cross bow.


**7 Claims, 8 Drawing Sheets**



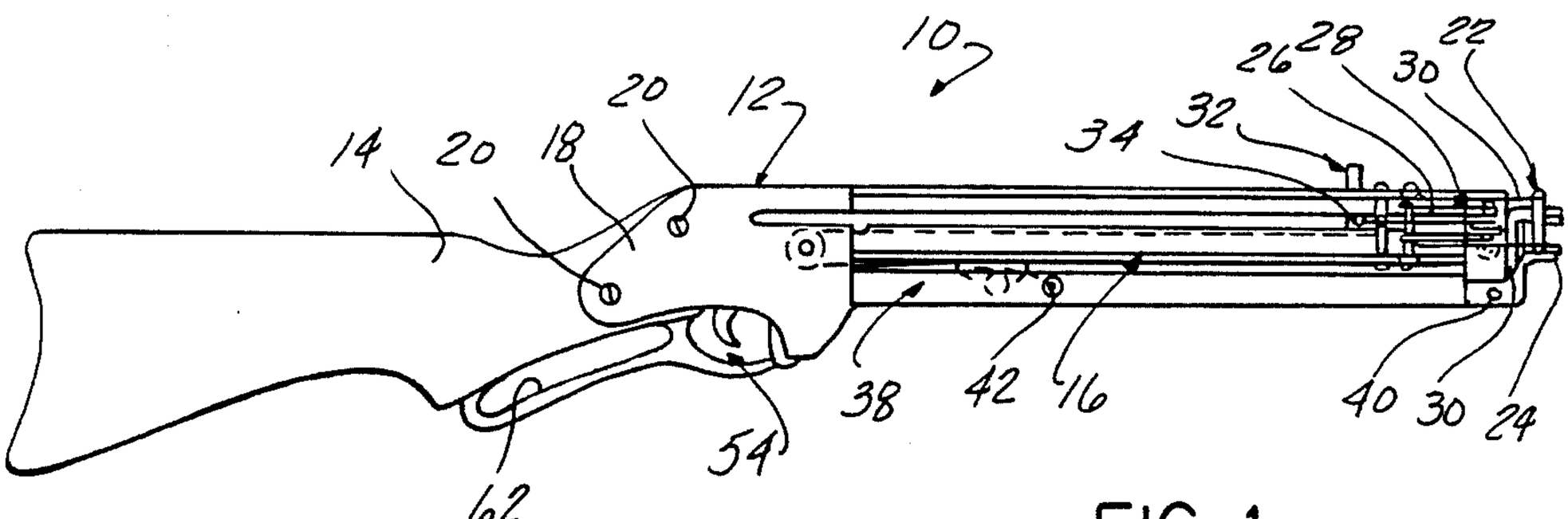
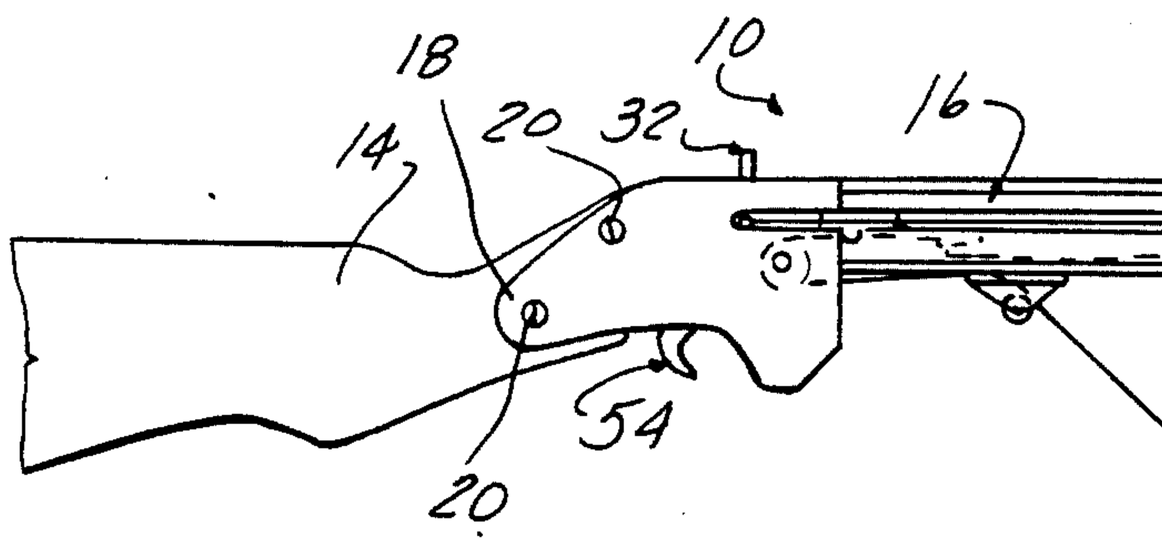



FIG-1



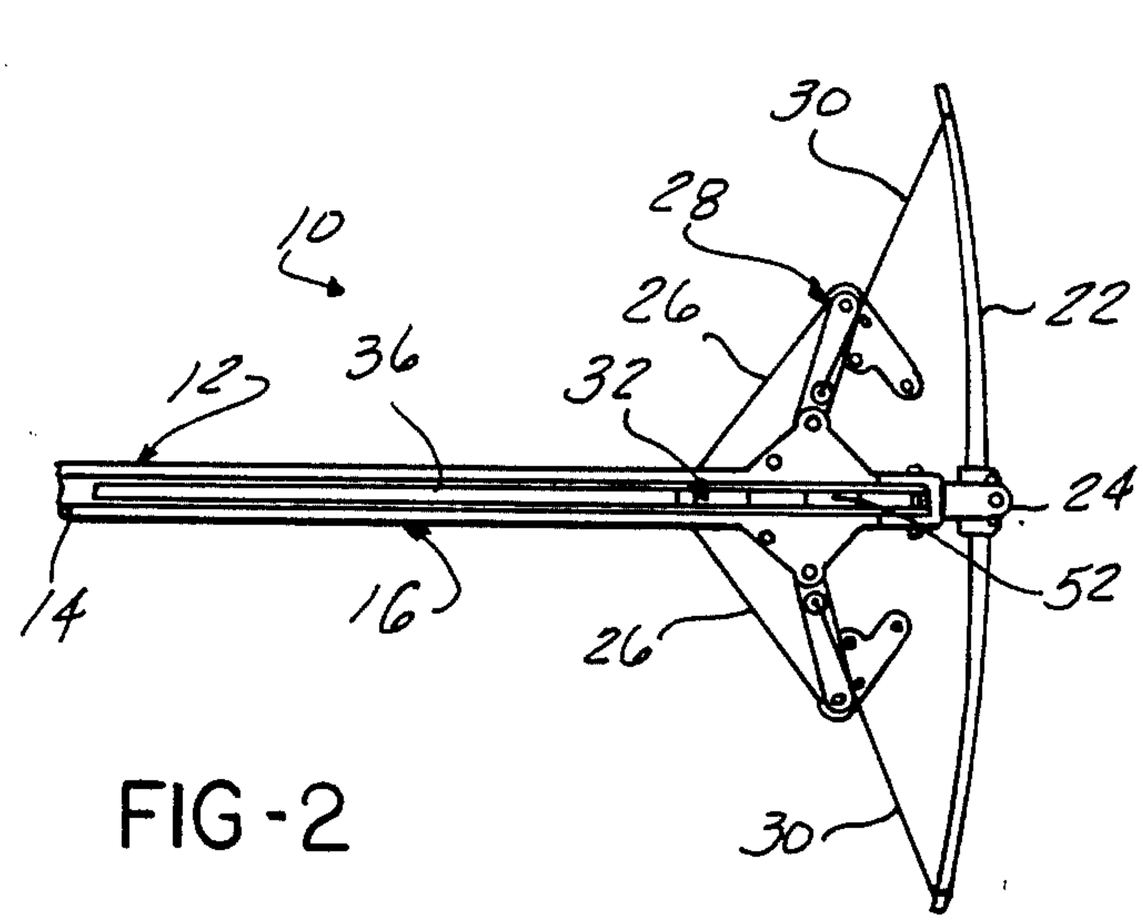




FIG-2

FIG-3

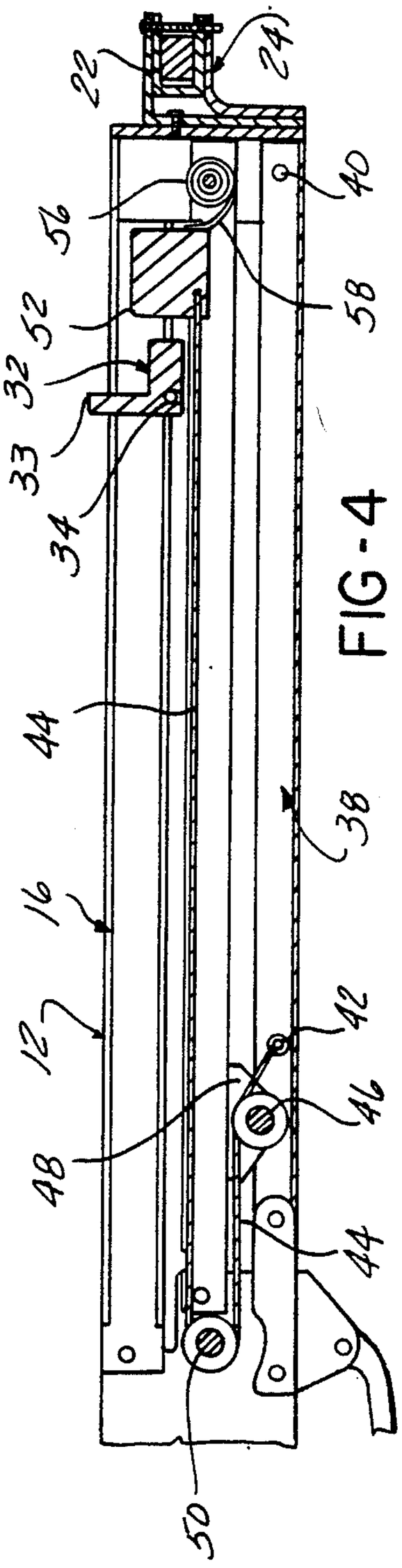

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FIG-4

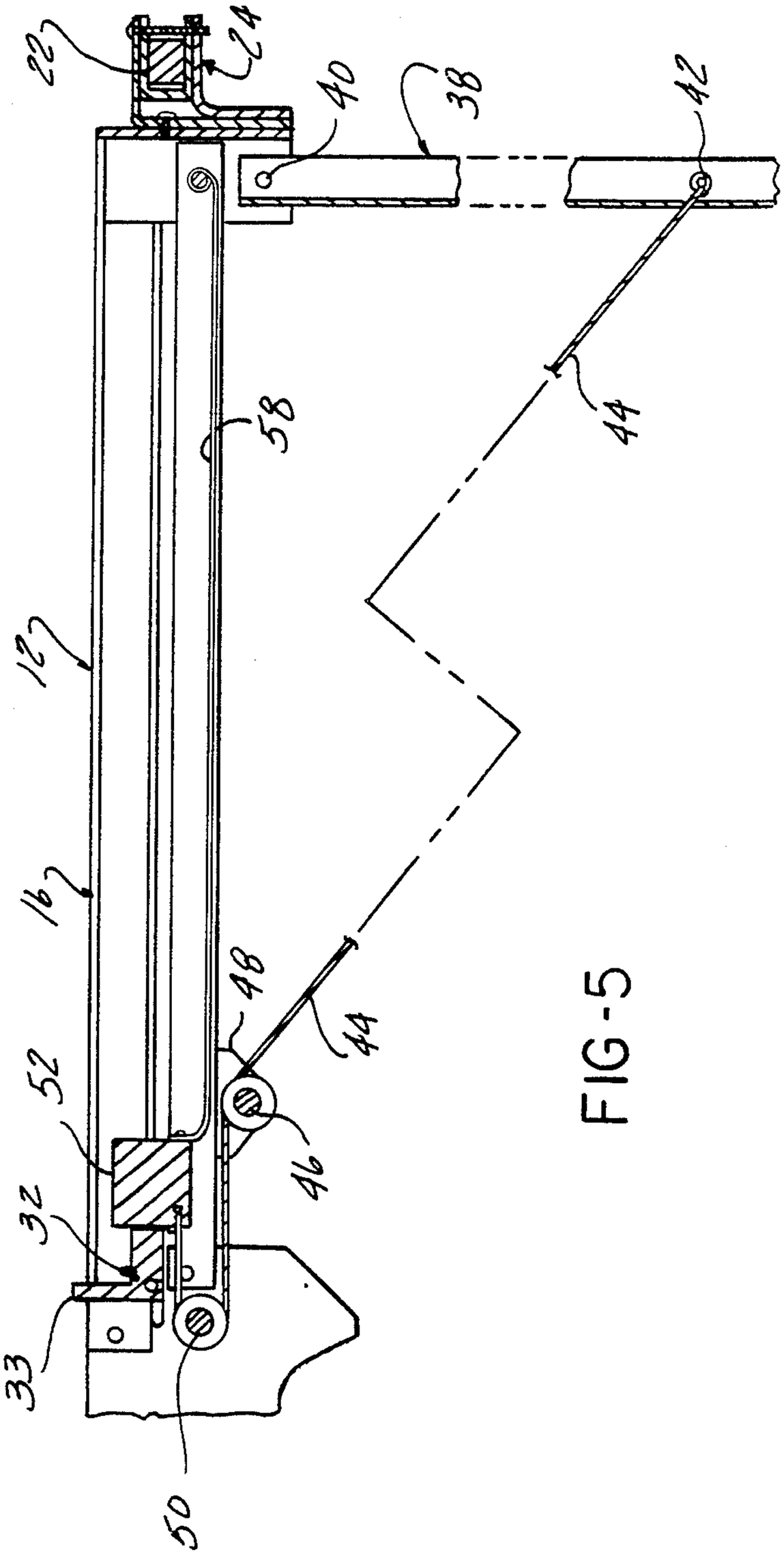
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FIG-5

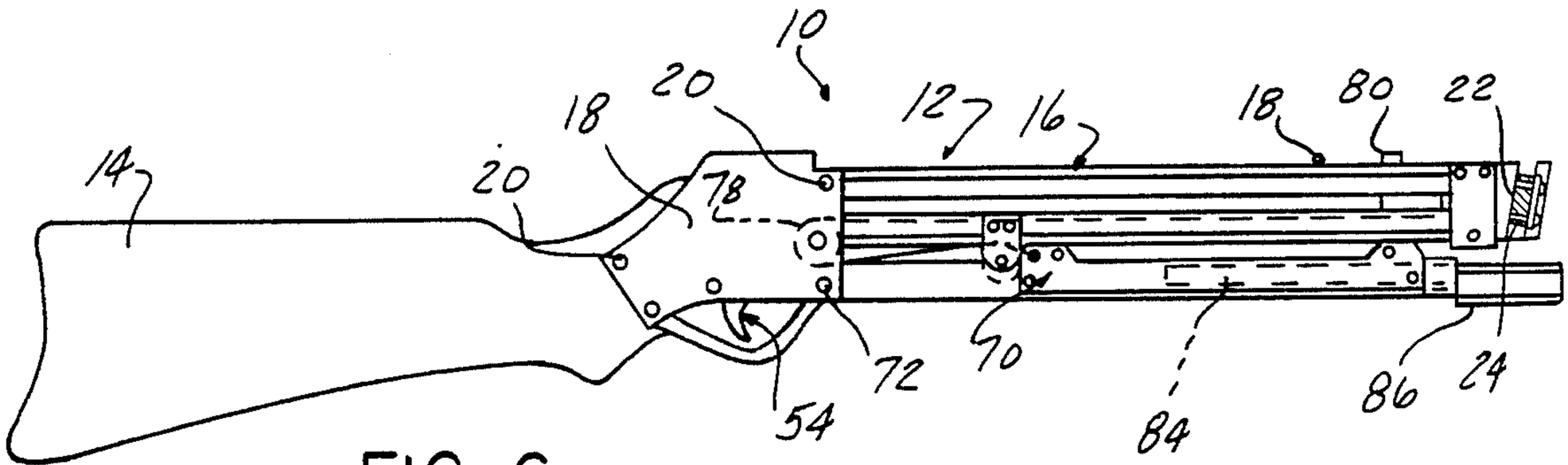
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FIG-6

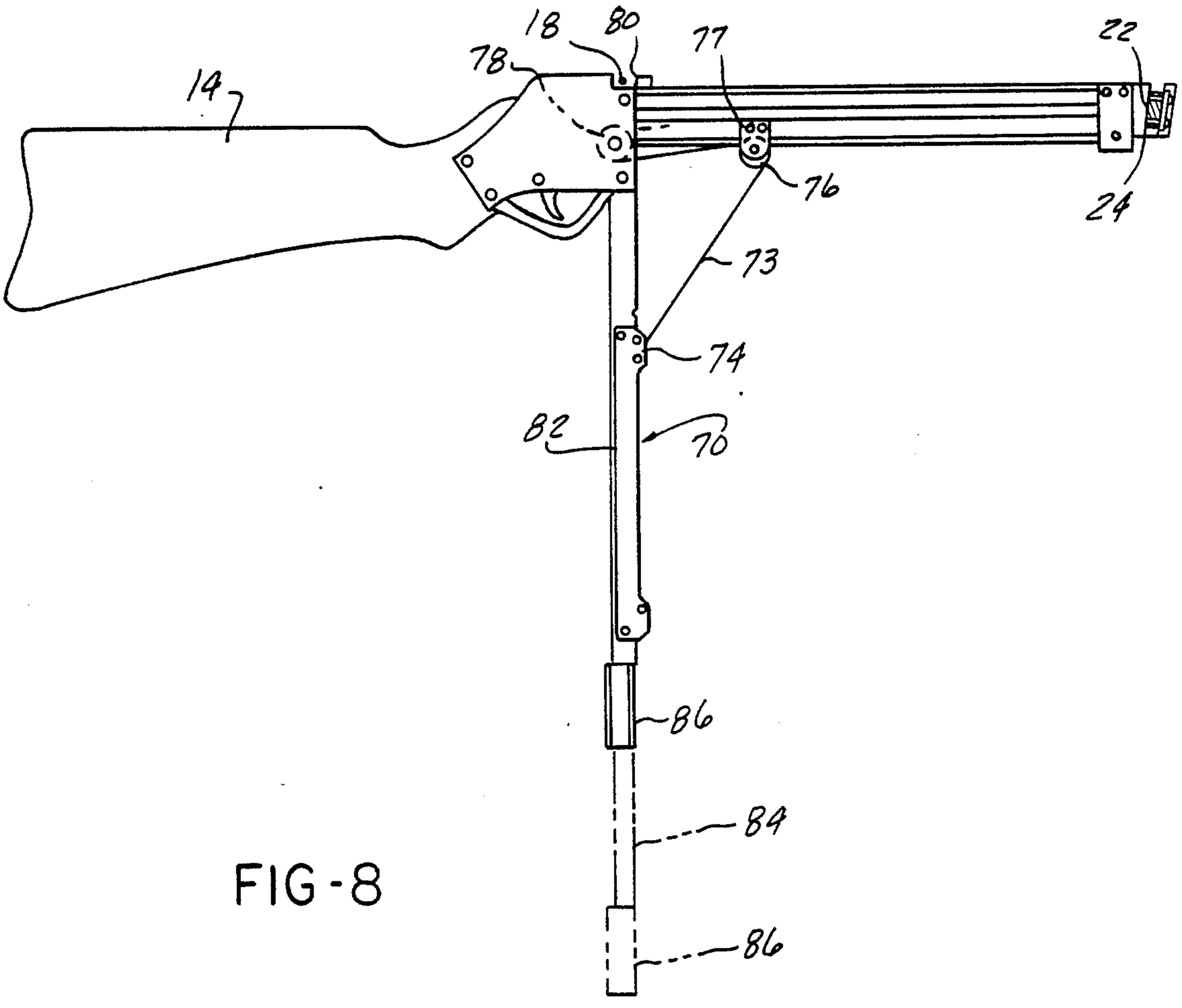
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FIG-8

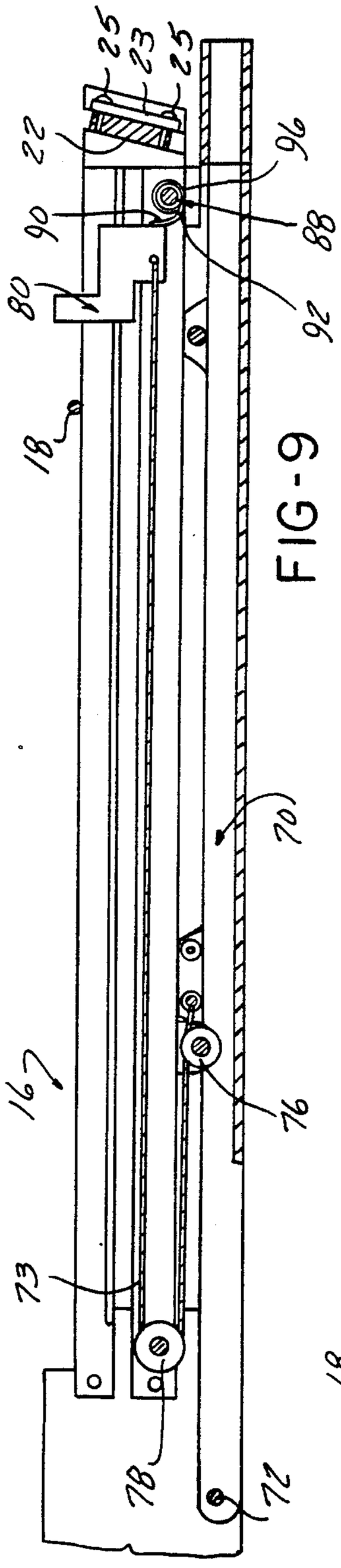


FIG-9

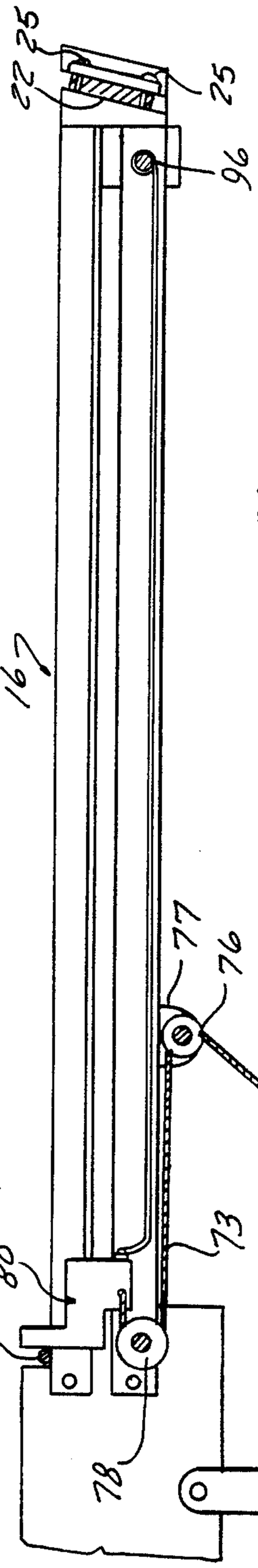


FIG-10

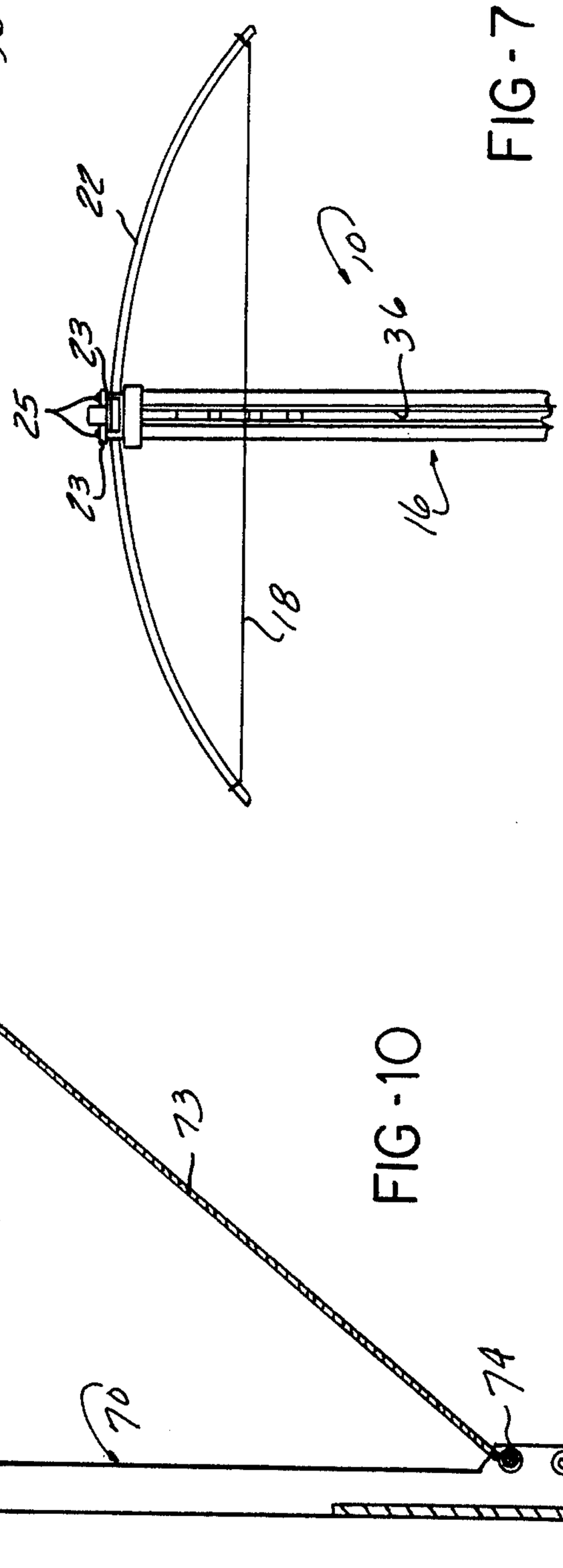


FIG-7

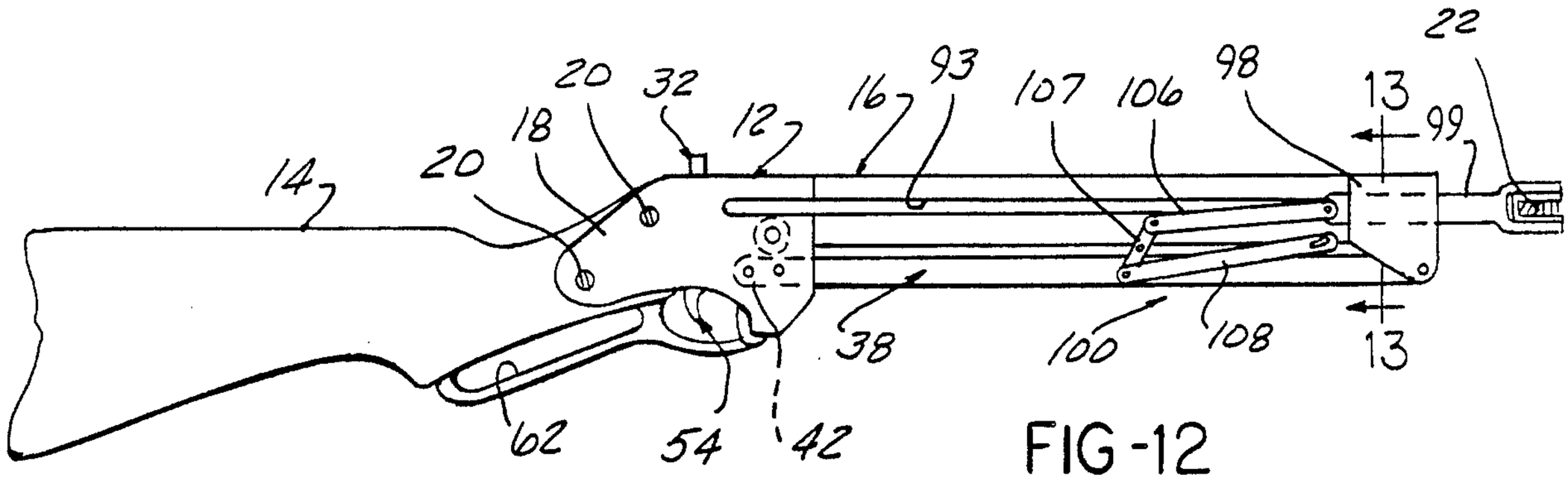
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FIG -12

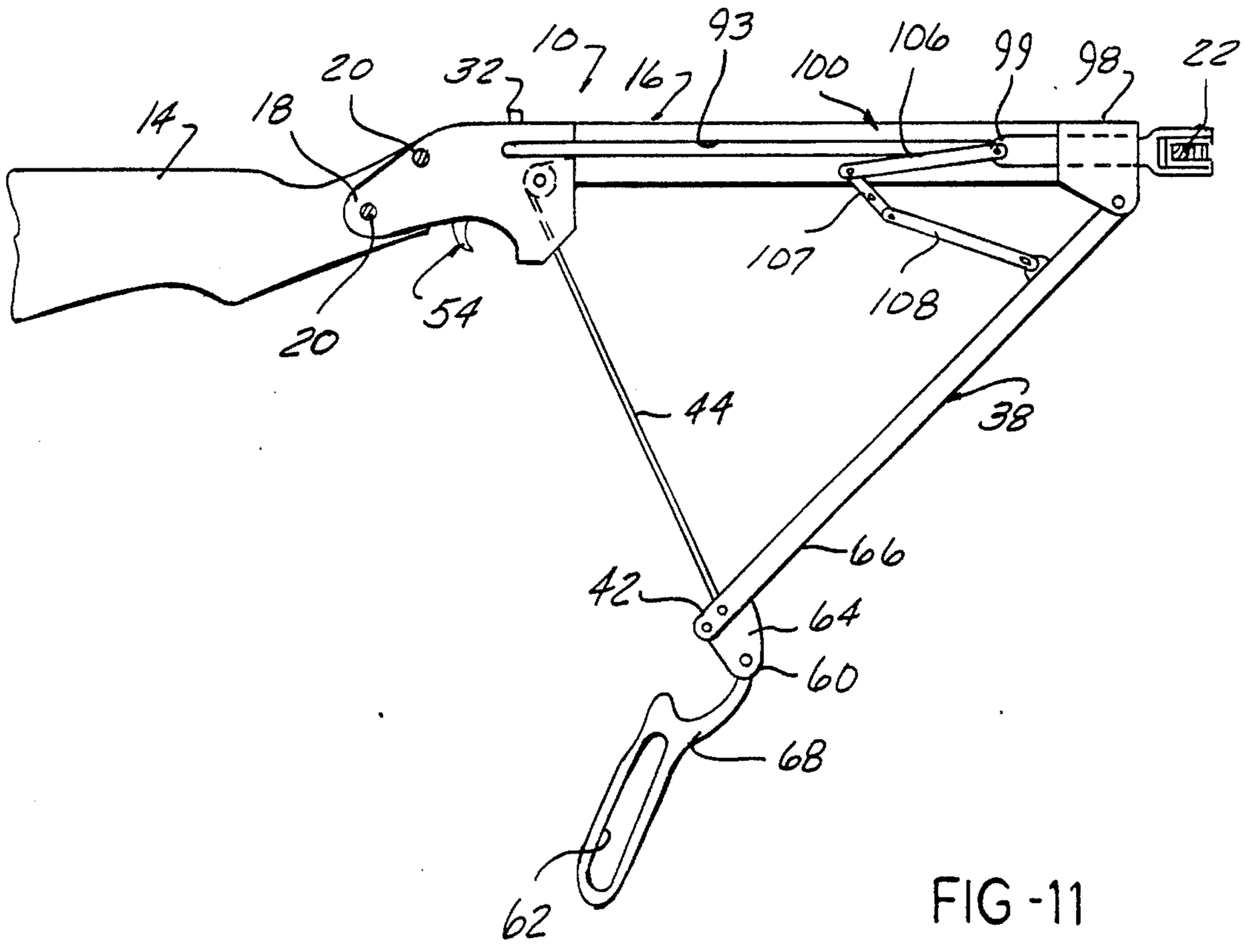
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FIG -11

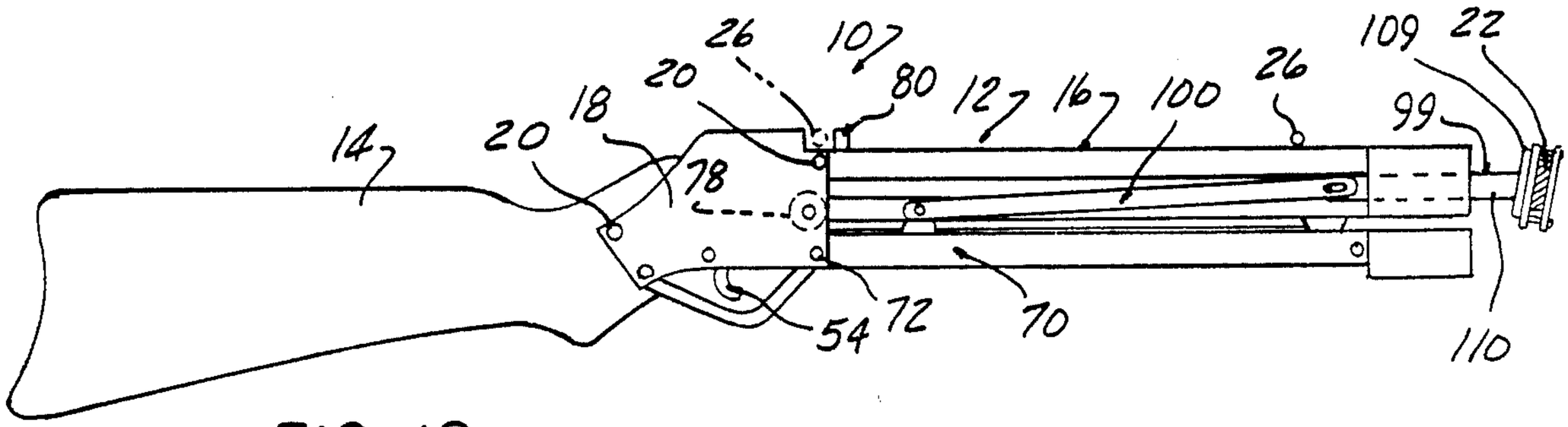


FIG-18

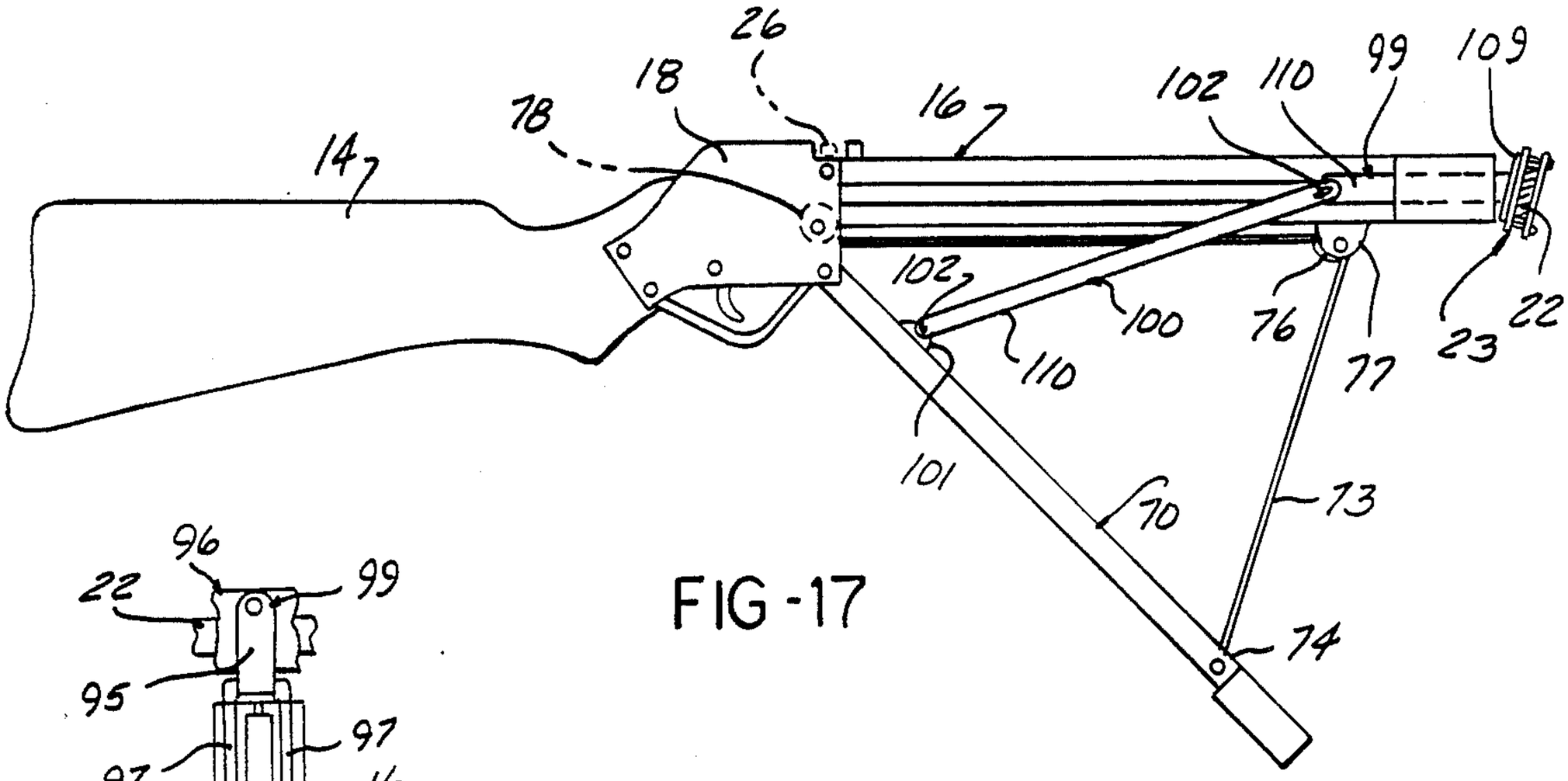


FIG-17


FIG-14

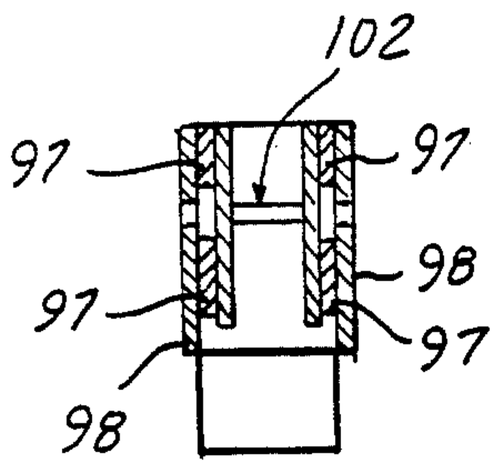


FIG-13

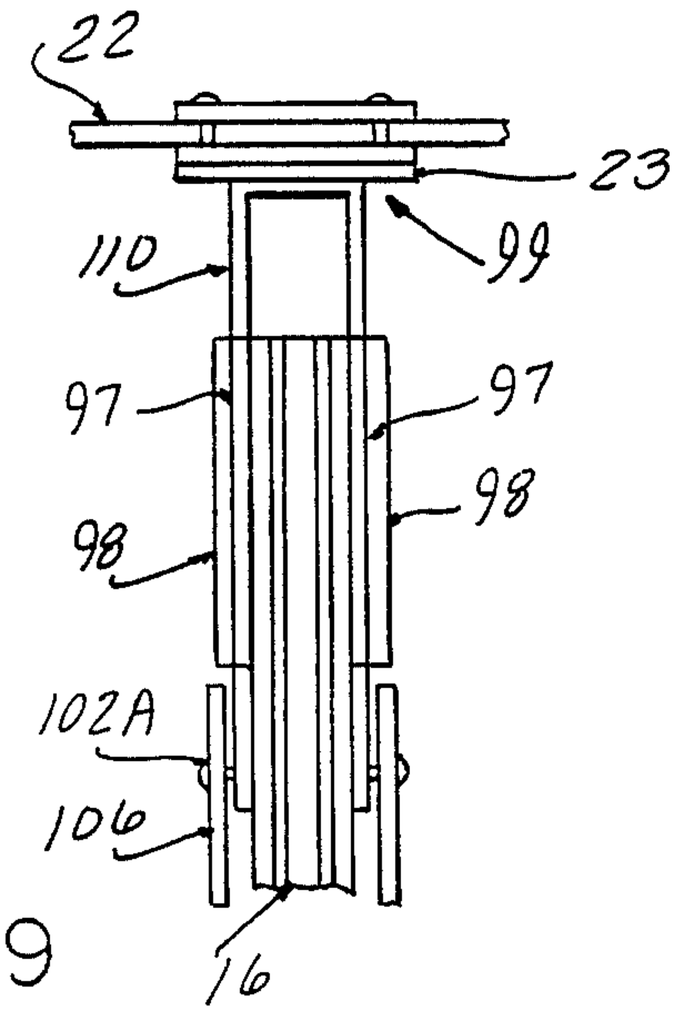


FIG-19

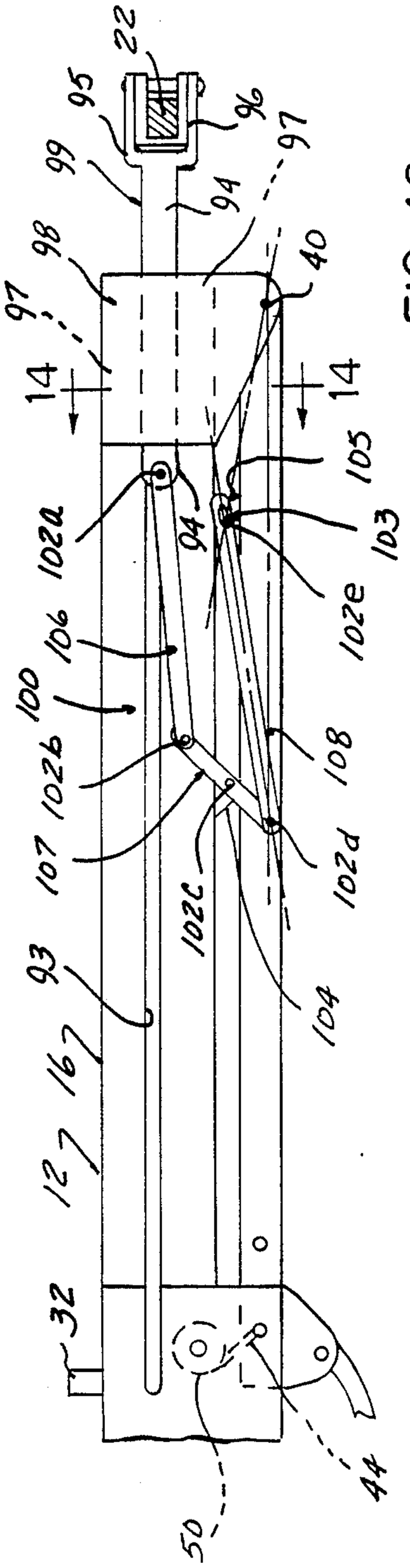
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FIG-16

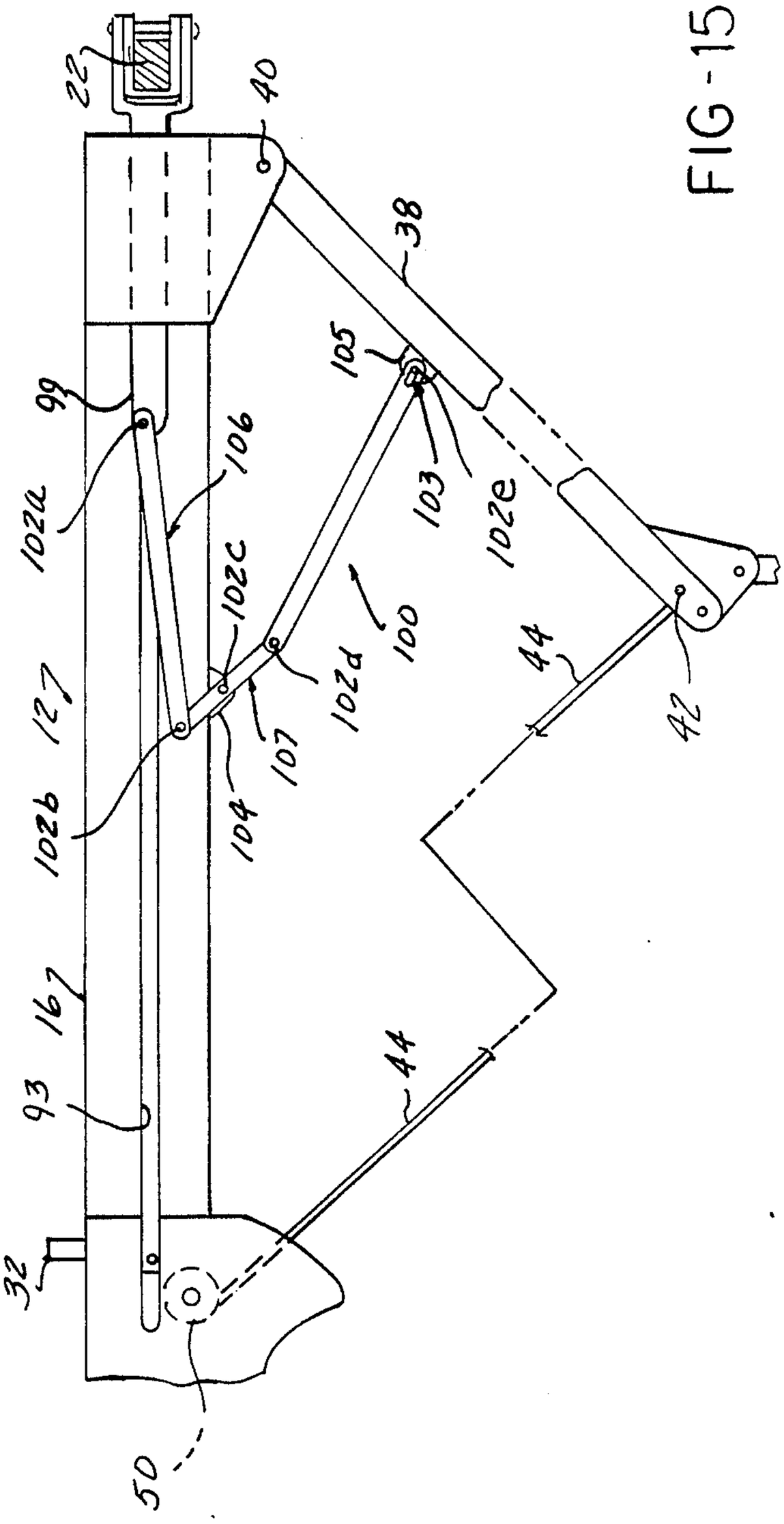
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FIG-15

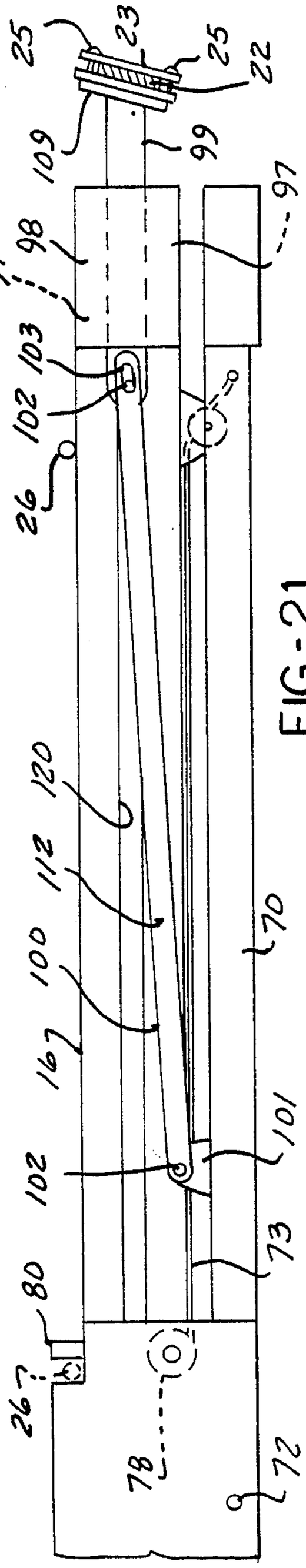
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FIG-21

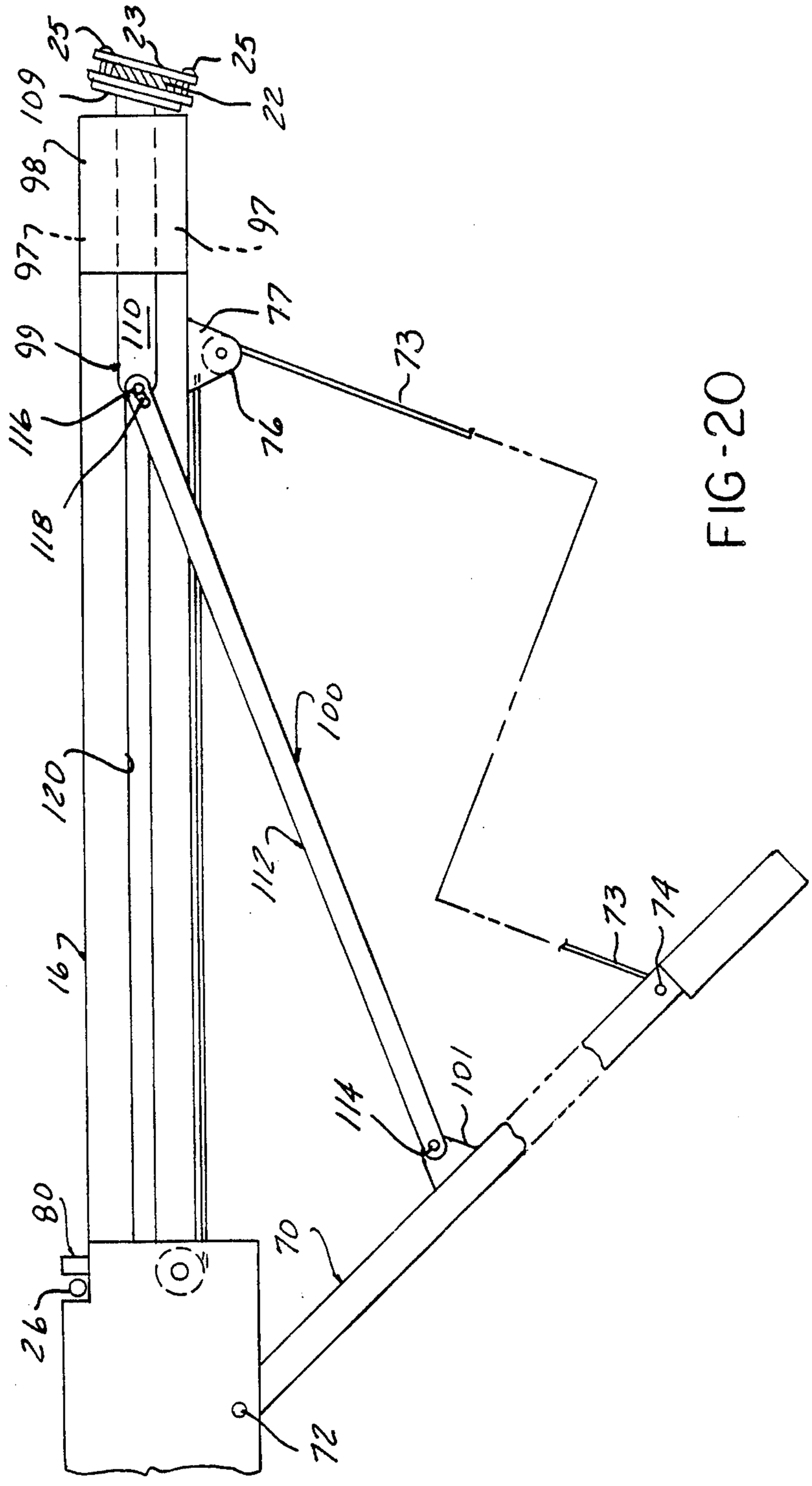
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FIG-20

# CROSS BOW WITH IMPROVED COCKING MECHANISM

This application is a continuation of application Ser. No. 06/859,698 filed on May 5, 1986, which is a continuation-in-part of application Ser. No. 06/778,316 filed on Sep. 20, 1985, now U.S. Pat. No. 4,649,892.

## BACKGROUND OF THE INVENTION

The present invention concerns cross bows, and more particularly, cross bows having cocking mechanisms for drawing the drawstring to a fully tensioned, drawn position.

## DESCRIPTION OF THE PRIOR ART

It has heretofore been recognized that it would be advantageous to facilitate the cocking of a cross bow by providing a mechanism for this purpose rather than to rely on manual drawing of the drawstring.

Devices which have been hefetofore been provided, however, have been complex, bulky, and cumbersome, such that cocking mechanisms are not commonly employed on cross bows. Examples of such devices are shown in U.S. Pat. No. 3,670,711, U.S. Pat. No. 3,043,287, U.S. Pat. No. 4,258,689. Ease of operation has not been achieved by many of these designs. In U.S. Pat. No. 4,649,892 referenced above, a cross bow is disclosed having a cocking mechanism which is relatively simple and compact, and yet may be easily manipulated with greatly reduced effort by a user.

The cocking mechanism disclosed therein requires an extensive range of pivoting motion of a cocking lever to draw the drawstring to the cocked position. The extent of motion required is a disadvantage as making cocking slower and more cumbersome than if a more compact motion could be employed and also precludes the application of leveraging to reduce the effort required in bending the limbs of the cross bow prod as the drawstring is moved to the fully drawn position.

It is the object of the present invention to provide an improvement over the cocking mechanism disclosed in U.S. Pat. No. 4,649,892 by reducing the required range of motion of the cocking lever in drawing the drawstring and also to allow a leveraging to be applied to reduce the maximum effort required to draw the cross bow.

## SUMMARY OF THE INVENTION

This and other objects of the present invention which will become apparent upon a reading of the following specifications and claims are achieved by a cross bow cocking mechanism consisting of an elongated cocking lever, pivotally mounted to the cross bow stock member, such as to be moved from a position extending along and beneath the stock member to a pivoted position, down and away therefrom.

An operating cable is provided, which is connected at one end to an intermediate point on the cocking lever, and is pulled by pivoting motion of the cocking lever. The operating cable passes about a series of guide pulleys, such as to extend lengthwise along the stock member and is attached to an engagement block slidably movable in a lengthwise track formed along the length of the stock member frame. The engagement block is movable into engagement with of the drawstring, such that upon pulling of the engagement block the drawstring is moved rearwardly when the cocking lever is pivoted away from the stock member.



Retraction means is also provided, consisting of a wind-up spring having an extensible flexible strip attached to the opposite side of the engagement block, such as to be extended upon cocking motion, and thereafter retracting upon movement of the cocking lever to its initial position. In alternate disclosed embodiments, the cocking lever is pivoted either at its forward or its rear end.

The improvement of the present invention comprises the mounting of the cross bow prod on a slide, moveable in and out from the forward end of the cross bow stock. The slide in turn is operated by a linkage system which retracts the slide and prod as the cocking lever is pivoted away from the stock and the drawstring is drawn to reduce the bending of the prod limbs and the maximum effort required. The point of connection of the cable to the slide is such as to minimize the range of pivoting motion required to fully retract the drawstring.

The linkage moves overcenter as the cocking lever returns to its normal position, such that the reaction force developed by the bending of the prod is exerted to maintain the cocking lever in its usual rest position.

## DESCRIPTION OF THE DRAWINGS

FIG. **1** is a side elevational view of a cross bow incorporating a cocking mechanism of which the present invention is an improvement.

FIG. **2** is a fragmentary plan view of the front portion of the cross bow shown in FIG. **1**.

FIG. **3** is a side elevational view of the cross bow shown in FIG. **1**, with the cocking mechanism fully extended.

FIG. **4** is an enlarged fragmentary sectional view of a portion of the cross bow shown in FIG. **1**.

FIG. **5** is an enlarged fragmentary sectional view of a cross bow section as shown in FIG. **2**, with the cocking mechanism in the extended position.

FIG. **6** is a side elevational view of a cross bow incorporating a cocking mechanism according to a second embodiment of which the present invention is an improvement, with the cocking mechanism in the return or normal position.

FIG. **7** is a fragmentary plan view of the front portion of the cross bow shown in FIG. **6**.

FIG. **8** is a side elevational view of the cross bow shown in FIG. **6** with the cocking mechanism in the fully extended position.

FIG. **9** is a fragmentary enlarged sectional view of the cross bow shown in FIG. **6**, depicting the details of the cocking mechanism in the return position.

FIG. **10** is an enlarged fragmentary sectional view of the cross bow shown in FIG. **8**, showing the details of the cocking mechanism, with the cocking mechanism in the extended position.

FIG. **11** is a side elevational view of the cross bow of the type shown in FIGS. **1–5** incorporating an improved cocking mechanism according to the present invention, depicting the cocking operation partially completed.

FIG. **12** is a side elevational view of a cross bow of the type shown in FIGS. **1–5** incorporating an improved cocking mechanism according to the present invention, shown in the cocked condition.

FIG. **13** is a view of the section **13—13** taken in FIG. **11**.

FIG. 14 is a plan fragmantery view of the portion of the cross bow shown in FIG. 11.

FIG. 15 is a fragmentary enlarged side view of the cross bow as shown in FIG. 11.

FIG. 16 is a fragmentary enlarged side view of the cross bow as shown in FIG. 12.

FIG. 17 is a side elevational view of the type of cross bow shown in FIGS. 6–10, depicted in the partially cocked condition.

FIG. 18 is a side elevational view of a cross bow of the type shown in FIG. 6–10 with the improved cocking mechanism according to the present invention, depicted in the cocked condition.

FIG. 19 is a fragmentary plan view of the front portion of the cross bow shown in FIGS. 17 and 18.

FIG. 20 is an enlarged fragmentary side elevational view of the cross bow as shown in FIG. 17.

FIG. 21 is an enlarged fragmentary side elevational view of the cross bow as shown in FIG. 18.

## DETAILED DESCRIPTION

In the following detailed description, certain specific terminology will be employed for the sake of clarity and a particular embodiment described in accordance with the requirements of 35 USC 112, but it is to be understood that the same is not intended to be limiting and should not be so construed inasmuch as the invention is capable of taking many forms and variations within the scope of the appended claims.

In co-pending application Attorney Docket Number BOZ-102, Ser. No. 778,405 filed on Sept. 20, 1985, now U.S. Pat. No. 4,649,892 there is disclosed a cross bow according to the configuration shown in FIGS. 1 and 2, in which the details thereof are set forth. Inasmuch as the present invention is directed to the cocking mechanism, the details of construction will not be hereinafter set forth for the sake of brevity.

The present invention as noted above comprises an improvement of the cocking mechanisms disclosed in Ser. No. 778,316 filed on Sept. 20, 1985 now U.S. Pat. No. 4,649,892. In order that this improvement can be understood, the aforementioned previously disclosed cocking mechanisms will also be described in FIGS. 1–10 herein prior to describing the improvement of the present invention.

Referring to the drawings, and particularly to FIGS. 1 and 2, a cross bow 10 includes an elongated stock member 12 including a butt portion 14, adapted to be positioned against the shoulder of the user, and a stock member frame 16 attached thereto with metal plates 18, forming a part of frame 16 and screws 20.

At the forward end of the stock member 12, is fixed a transversely extending prod 22 of suitable flexible, resilient material and is pivotally attached at its midpoint to the stock member frame 16.

The prod 22 is connected to the forward end of the stock member frame 16 by means of a clevis 24, which as to be pivotally mounted so as to be readily detachable to the stock member frame 16, as described in the referenced patent application in detail.

The prod 22 is adapted to be flexed by drawing of a central nocking point of drawstring 26 towards the rear of the stock member 12 to constitute a spring means generating a spring force increased with drawing of the drawstring 26 acting to urge the nocking point to its restored position. For this purpose, an interconnection between the drawstring 26 segments lying on either side of the stock member 12, and the tips of the prod 22 is provided. As described in detail in the aforementioned application Ser. No. 778,405, the interconnection comprises variable leverage devices 28 which by means of load cables 30 attached to each prod tip 22 causes flexing movement of the prod 22 upon motion of the nocking point of the drawstring 26, aligned with nocking point located at the point the drawstring 26 passes across the stock member 12.

The variable leverage devices 28 function to produce a variation in the force required in moving the drawstring 26 to the rear with increasing draw distance. As described in the aforementioned application Ser. No. 778,405 in detail, it is important to constrain the side-to-side movement of the drawstring 26 with respect to the stock frame 16. Accordingly, a slider element 32 is provided, secured by means of bead fasteners 34, to the central point of the drawstring 26, preventing side-to-side movement relative the element 32.

A slider element 32 is itself in turn constrained to move in a lengthwise slot, comprising a track means 36, formed in the stock member frame 16 for the purposes described in the above referenced application; and includes a projection 33 adapted to engage a arrow or bolt to be launched.

The cocking mechanism according to the present invention includes an elongated cocking lever 38, pivotally mounted at 40 at its forward end to the front end of the stock member 12 and is adapted to be pivoted in forward and return movement from an initial position lying alongside and beneath stock member 12, as shown in FIG. 1, to an extended position pivoted down and away therefrom, as shown in FIG. 3.

Attached at a point intermediate the length thereof, is one end of an operating cable 44 which is attached to cocking lever 38 at 42 so as to be drivingly connected so as to be pulled by the pivoting motion of the cocking lever 38, moving about its pivot mount 40.

Operating cable 44 is directed by means of guiding means as best seen in FIGS. 4 and 5, and comprises a first pulley 46 located intermediate the length of the stock member 12, mounted by means of a bracket 48 secured to the underside of the stock member frame 16, and also located intermediate the length of the cocking lever 38. The guide means also includes a second pulley 50 spaced to the rear of first pulley 46 with the operating cable 44 passing above the first pulley 46 and around the second pulley 50, such as to extend lengthwise and forwardly through the stock member frame 12.

At the forward end of the stock member frame 16, the operating cable 44 is attached to an engagement block 52, also slidably mounted within the track 36 located forwardly of the slider element 32, so as to be engageable therewith upon pulling motion of the operatng cable 44.

The engagement block 52 thus is able to come into contact with the slider element 32 as block 52 moves to the rear and the operating lever 38 is pivoted away from the stock member frame 16, as shown in FIG. 5, such as to cause slider element 32 to also be moved to the rear.

A suitable trigger mechanism 54, the details of which are not shown herein, serves to engage the slider element 32 and restrain it in the retracted or drawn position for selective release in conventional fashion.

In order to provide for return movement of the engagement block 52, a retraction means is provided, comprised of a wind up coil spring 56 mounted at the forward end of the stock member frame 12 including an extensible spring strip 58 attached to the forward end of

the engagement block **52**. As the engagement block **52** moves to the rear, the extensible spring strip **58** unwinds from the wind-up coil **56**, but acts to urge the block **52** to the return, forward position.

The cocking lever **38** is formed with a handle portion **60**, which includes a finger loop **62** able to be conveniently gripped by the user in order to accomplish the cocking motion with a bracket **64**, securing the same to the strut **66**, forming the main body of the cocking lever **38**. Adjacent the finger loop **62** is a trigger guard **68** adapted to surround the trigger of the trigger mechanism **54**, thus creating the familiar lever action appearance to the cross bow.

Accordingly, it can be seen that a relatively simple, yet effective cocking mechanism is provided which is also compact and able to be housed easily within the normal lines of the conventional cross bow, and which is advantageously combined with the constrained drawstring slider design according to the aforementioned co-pending patent application Ser. No. 778,405.

Referring to FIGS. **6–10**, an alternate arrangement is shown, in which a cocking mechanism is incorporated in a conventional cross bow design. The cross bow **10**, in this instance, similarly includes a stock member **12** including a butt portion **14** and a stock member frame **16**, connected by plates **18** and screws **20**.

The prod **22** is rigidly affixed at the forward end mounted by any conventional means such as by clamping plates **23** which are attached by bolts **25**.

The drawstring **26** is held in the drawn retractive position by a trigger mechanism **54**, and selectively released for firing a bolt, (not shown) in the manner generally well known in the art.

In this embodiment, a cocking lever **70** is provided which is pivoted at its rear end **72** to the stock member frame **16**, such as to swing in a opposite sense from the above described embodiment, from a position underlying the stock member frame **16**, as shown in FIG. **6** to a down and away position shown in FIG. **8**. This pivoting motion accomplishes the drawing of the drawstring **18** to the fully drawn position.

This is also achieved by means of an operating cable **73** which is connected at one end at **74**, to an intermediate point along the length of the cocking lever **70**, such as to be pulled by the pivoting motion of the cocking lever **70** in moving away from the stock member **12**.

Operating cable **73** passes around a first pulley **76** to a second pulley **78** spaced to the rear such that the operating cable may pass around to extend forwardly within the stock member frame **16** and be connected to the engagement block **80** as in the above described embodiment. The engagement block **80** is also slidably mounted in the track **36** slidably receiving the slider element **32**.

Thus, the operating cable **73** pulls the engagement block **80** rearwardly to draw the drawstring to the rear to the fully drawn position shown in FIGS. **8** and **10**. The trigger mechanism **54** is engageable therewith to hold the same in the fully retracted position, allowing return of the cocking lever **70**.

Cocking lever **70** in this embodiment, is of two piece construction and includes members **82** and **84**, **84** having a handle **86** affixed thereto and adapted to be slidably engaged such that member **84** may be extended therefrom to increase the length of the cocking member **70** and increase the leverage able to be exerted thereby.

A retracting wind up coil spring **88** is also included having extensible strip **92** connected at **90** to the forward end of the engagement block **80**. The retracting coil spring **88** is able to be unwound upon rearward travel of the engagement block **80**, in the position as shown in FIG. **10** and upon release thereof rewound about a spring axle **96**.

In FIGS. **11–16** there is shown the improved cocking mechanism for the embodiment of FIGS. **1–6** shown above, in which the same construction is employed for the components of the cross bow **10** other than the cocking mechanism.

Referring to FIGS. **11** and **12**, according to the concept of the present invention, the prod **22** is mounted to be movable in and out from the front end of the frame **16** so as to be drawn towards the frame **16** as the cocking lever **38** is pivoted away from the frame **16**, as shown in FIG. **11**; and, to be moved out as the cocking lever **38** is pivoted towards the frame **16** as shown in FIG. **12**.

Thus as the cable **44** is drawn to pull the slide element **32** and drawstring **36** to the rear, the prod **22** also is moved to the rear but a lesser distance to negate in part the bending of the limbs of the prod **22**. Hence, full bending thereof will not occur until the prod **22** is moved out upon return pivoting movement of the cocking lever **38**.

This greatly reduces the peak effort required to move the drawstring **26** to the cock position so that the cable **44** may be attached at **42** at a point further out on the cocking lever **38** to maximize travel of the slider block **32** resulting from pivoting of the cocking lever **38**, to minimize the range of travel of the cocking lever **38** required thereby to carry out the cocking action.

The retraction-extension of the prod **22** produced by linkage means **100** drivingly connecting the cocking lever **38** and a prod slide **99**. The prod slide **99**, as seen in FIG. **13** is a double fork shaped element, having a forward fork **95** receiving a prod clevis **96** and forward fork **95** together.

A rear fork **94** of the prod slide **99** is slidably mounted between two side plates **98** attached at the forward end of the frame **16**, with upper and lower spacer plates attached to the inside thereof (FIGS. **13**, **14**) establishing guide means acting on the prod slide **99** to guide the same through its in and out movement. Cocking lever **38** is pinned at **40** to the side plates **98** for pivoting movement.

Linkage means **100** provides a mechanical advantage in the leveraging applied as the cocking lever **38** moves to the normal position against frame **16** acting on the prod slide **99** to force the same outwardly, such that the peak effort required to overcome the resistance of the prod **22** is greatly reduced.

As seen in FIGS. **15** and **16**, linkage means **100** includes a series of interconnected link pairs, including prod slide limb pair **106**, which has one end pinned at **102***a* to the rear fork **94** of the prod slide **99** and at the other end to fulcum lever pair **107**. Fulcum lever pair **107** is centrally pivoted at **102***c* on a pivot block **104** affixed beneath frame **16**, and at its other end pivoted at **102***d* to a cocking lever link pair **108**. Link pair **108** has its other end at **102***e* pinnned to a pivot block **105** fixed to the cocking lever **38**. An elongated slot **103** allows limited lost motion of each link in link pair **108**, so that as the cable **44** is pulled and prod link **99** moves to the rear, the cocking lever **38** may be pivoted slightly past the fully retracted position of the prod link **99** and ensure that slide **32** is cocked by being engaged with the trigger mechanism.

As the cocking lever **38** pivots back a powerful leverage is exerted by the cocking lever, particularly since the pivot **105** is located relatively close to the pivot point **40**.

This leverage increases greatly as the cocking lever **38** approaches the frame **16** due to the toggle effect achieved as lever pair **108** approaches alignment with the cocking lever **38**.

During the final pivotal movement the lever pair **108** moves overcenter, as indicated by the centerlines in FIG. **16**, such that the reaction force exerted by the prod **22** and through the linkage means **100**, acts so as to urge the cocking lever **38** towards the rest position shown in FIG. **16**. Thus, the cocking lever **38** is stabilized in that position.

This improvement may also be adapted to the cross bow shown in FIGS. **6–10**, and this adaption is shown in FIGS. **17–21**.

Referring to FIGS. **17** and **18**, again, the prod **22** is mounted to be movable in-and-out from the front end of the frame **16** by means of a prod slide **99** slidably moved on the frame **16**.

The prod slide **99** includes a front mounting plate **109** affixed to prod mounting bracket **23**. The slide **99** includes a fork **110** (FIG. **19**) the legs of which received between pairs of spacer plates **97** affixed to the front end of the frame **16** and cover plates **98** to be guided in its in-and-out motion.

Linkage means **100** are provided drivingly connecting the cocking lever **70** and the prod slide **99** so as to move the prod **22** rearwardly as the drawstring **26** is drawn rearwardly by the motion of cable **73** and slide block **80**; and to move the prod **22** forwardly the cocking lever **70** is moved back towards the normal rest position.

In this case, the linkage means **100** takes the form of a single link pair **112** pivoted with cross pin **114** to a pivot block **101** fastened to cocking lever **70**. Link pair **112** is pivoted to fork **110** by cross pin **116**, passing through elongated slot **118** and lengthwise slot **120** in frame **16**.

Cable **73** is connected at the extreme end of cocking lever **70** to produce maximum cable travel to minimize the rotation required to cock the drawstring **26**.

Elongated slot **118** ensures sufficient travel of the cocking lever **70** to complete the cocking action as the prod slide **99** moves to its inmost position.

Link pair **112** is connected at a point on the cocking lever **70** towards the pivot point **72** to create a powerful leverage action on the prod slide **99** as the cocking lever is moved to its rest poisition. A toggle action is effected as link pair **112** approaches alingment with cocking lever **70** to greatly reduce the maximum effort required to move the prod slide **99** out to bend the prod limbs against the resistence of the restrained drawstring **26**.

As the link pair **112** moves to the rest position, it moves overcenter with respect to the pivot axis **72** such that the reaction force exerted by the prod limbs through link pair **112** acts to urge the cocking lever **70** towards the rest position.

Accordingly, it can be appreciated that the improved cocking mechanism results in a substantially reduced cocking motion, and at the same time reduces the maximum effort required. This is accomplished with a relatively simple mechanism.

I claim:

**1**. A cross bow comprising; an elongated stock member having a forward end and a rear end; a drawstring means having end string segments and a drawstring means midportion connected to said end string segments, said drawstring means extending transversely to said stock member with the drawstring means midportion thereof located at the stock member able to undergo drawing movement; spring means for generating a spring force acting on said drawstring means midportion, said spring force increasing with increasing drawing movement thereof so as to urge said drawstring means midportion to a restored position, said spring force reaching a predetermined peak level at a fully drawn position of said drawstring;

trigger means carried on said stock member adjacent the rear end thereof for releasably securing said midportion of said drawstring means in a fully drawn position;

cocking means comprising a cocking lever mounted on said stock member and means causing said cocking lever to act on said spring means upon movement thereof in forward and return movements in opposite direction, movement of said cocking lever in said forward direction acting on said drawstring to draw said drawstring means midportion to said fully drawn position, and simultaneously acting on said spring means to at least partially nullify the generation of said spring force when said drawstring means midportion is fully drawn, by reducing the level at which said spring force otherwise peaks, and upon return movement said means causing said cocking lever to act on said spring means to generate said spring force at said peak level with the aid of a mechanical advantage, whereby reducing the effort otherwise required in drawing the drawstring means midportion to the fully drawn position.

**2**. The crossbow according to claim **1** wherein said spring means comprising an elongated flexible prod member having opposite ends and a midpoint, mounted at its midpoint to the forward end of said stock member and having a respective one of said drawstring string segments attached to a respective one of said prod ends, and wherein said cocking lever is drivingly connected to said prod by means operative to move said prod towards or away from said trigger means a lesser distance than the drawing movement of said drawstring means midportion to cause a partial reduction of the generation of spring force otherwise produced by drawing of said drawstring means midportion.

**3**. In a cross bow for projecting bolts, said cross bow of the type including an elongated stock member, an elongated prod having opposite tips, said prod mounted transversely at a forward end of said stock member with said tips on either side thereof, a drawstring extending between the tips of said prod and across said stock member, and a trigger mechanism mounted to said stock member to the rear of said prod, said trigger mechanism including means for releasably holding a central nocking point of said drawstring in a drawn position with said prod flexed, said cross bow further including a cocking mechanism for moving said drawstring to said drawn position, said cocking mechanism including an elongated cocking lever having a forward and a rear end, said cocking lever pivotally mounted at one end thereof to said stock member to be movable from a rest position lying along said stock member to a position rotated away therefrom, an operating cable attached at one end to said cocking lever so as to be pulled by said pivoting movement of said cocking lever away from

said stock member, track means extending along said stock member; and engagement block mounted in said track means for movement therealong, located between said drawstring and said prod to be engageable with said nocking point of said drawstring; said operating cable connected at the other end to said engagement block; and operating cable guide means aligning said operating cable with said track means to cause said engagement block to be pulled rearwardly by said pivoting movement of said cocking lever to draw said nocking point rearwardly, the improvement comprising:

prod slide means on said stock member mounting said prod for movement along the axis of said stock member in a direction towards and away from said trigger mechanism;

linkage means drivingly connecting said cocking lever and said prod slide means causing said prod and said prod slide means to be moved inwardly simultaneously with drawing of said nocking point as said cocking lever is pivoted away from said rest position, said prod being moved thereby a distance substantially less than the distance said engagement block is moved by pivoting movement of said lever, said linkage means causing said prod and said prod slide means to also be moved outwardly as said cocking lever is pivoted to return after said drawstring is drawn.

**4**. The cross bow according to claim **3** wherein said cocking lever is pivotally attached to its forward end to the forward end of said stock member to pivot beneath said stock member and said linkage means includes a first elongated lever means pivotably connected at one end to an end of said prod slide means; at the one end to the other end of the first lever means; a pivot block fixed to said stock member and pivotally connected to the midpoint of said first elongated lever means; and a second elongated lever means pivotally connected at one end to the other end of said first elongated lever means and pivotally connected at the other end to an intermediate point on said cocking lever.

**5**. The cross bow according to claim **3** wherein said cocking lever is pivotally mounted at its rear end to said stock member, and said linkage means comprises an elongated lever means pivotally connected at one end to said prod slide means and at the other end to an intermediate point on said cocking lever.

**6**. The cross bow according to claim **3** wherein said linkage means includes lever means moving overcenter as said cocking lever moves to the rest position acting to urge said cocking lever towards said rest position.

**7**. The cross bow according to claim **3** wherein said linkage means includes lever means pivotally connected to said cocking lever and drivingly connected to said prod slide means, said lever means approaching alignment with said cocking lever as said cocking lever approaches said rest position whereby a toggle leverage effect is exerted on said prod slide by said cocking lever.

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